

CLAIMS:

1. A method comprising:  
receiving a first signal having a first frequency and a second signal having a  
second frequency, the first and second frequencies being different from a frequency of an  
incoming RF signal;  
generating at least one local oscillator signal having a frequency determined as a  
function of the first and second frequencies; and  
generating at least one baseband signal as a function of the local oscillator  
signal and the RF signal.

2. The method of claim 1, wherein the frequency of the local oscillator signal  
is one of a sum and a difference of the first and second frequencies.

3. The method of claim 1, wherein generating the at least one local oscillator  
signal comprises generating an in-phase local oscillator signal and a quadrature local  
oscillator signal.

4. The method of claim 1, further comprising applying the local oscillator  
signal to convert the RF signal down to an in-phase baseband signal and a quadrature  
baseband signal.

5. The method of claim 1, further comprising generating a quadrature  
representation of at least one of the first and second signals.

6. A wireless communication device comprising:  
a downconverter to generate at least one baseband signal as a function of an RF  
signal and of a local oscillator signal, the local oscillator signal having a frequency  
determined as a function of first and second frequencies different from a frequency of the  
RF signal; and  
a modem to demodulate the at least one baseband signal.

7. The wireless communication device of claim 6, wherein the  
downconverter comprises a quadrature signal generator to generate in-phase and  
quadrature local oscillator signals having a frequency equal to one of a sum and a  
difference of the first and second frequencies.

8. The wireless communication device of claim 6, further comprising:  
a first frequency oscillator external to the downconverter and configured to  
generate a first signal having the first frequency; and  
a second frequency oscillator to generate a second signal having the second  
frequency.

9. The wireless communication device of claim 8, wherein the second  
frequency oscillator is integral with the downconverter.

10. A demodulator comprising:  
a quadrature signal generator to generate in-phase and quadrature local  
oscillator signals having a frequency determined as a function of first and second  
frequencies different from a frequency of an incoming RF signal;  
a first mixer to generate an in-phase baseband signal as a function of the in-  
phase local oscillator signal and the RF signal;  
a second mixer to generate a quadrature baseband signal as a function of the  
quadrature local oscillator signal and the RF signal; and  
a modem to demodulate the in-phase and quadrature baseband signals.

11. The demodulator of claim 10, wherein the frequency of the in-phase and  
quadrature local oscillator signals is one of a sum and a difference of the first and second  
frequencies.

12. The demodulator of claim 10, further comprising:  
a first frequency oscillator to generate a first signal having the first frequency;  
and

4 a second frequency oscillator to generate a second signal having the second  
frequency.

13. An integrated circuit comprising:

2 a quadrature signal generator to generate in-phase and quadrature local  
oscillator signals having a frequency determined as a function of first and second signals  
4 having first and second frequencies different from a frequency of an RF signal;  
a downconverter to generate in-phase and quadrature baseband signals as a  
6 function of the RF signal and of the in-phase and quadrature local oscillator signals; and  
a modem to demodulate the in-phase and quadrature baseband signals.

14. The integrated circuit of claim 13, wherein the frequency of the local  
2 oscillator signals is one of a sum and a difference of the first and second frequencies.

15. The integrated circuit of claim 13, further comprising a phase shifter to  
2 generate a quadrature representation of at least one of the first and second signals.

16. The integrated circuit of claim 13, wherein the quadrature signal generator  
2 is coupled to receive the first signal from a first frequency oscillator external to the  
integrated circuit and to receive the second signal from a second frequency oscillator.

17. The integrated circuit of claim 16, wherein the second frequency oscillator  
2 is integral with the integrated circuit.

18. A processor readable medium containing processor executable instructions  
2 for:

receiving a first signal having a first frequency and a second signal having a  
4 second frequency, the first and second frequencies different from a frequency of an RF  
signal;  
6 generating at least one local oscillator signal having a frequency determined as a  
function of the first and second frequencies; and

8           generating at least one baseband signal as a function of the at least one local  
oscillator signal and the RF signal.

19.   The processor readable medium of claim 18, wherein the frequency of the  
2   local oscillator signal is one of a sum and a difference of the first and second frequencies.

20.   The processor readable medium of claim 18, further containing processor  
2   executable instructions for generating an in-phase local oscillator signal and a quadrature  
local oscillator signal.

21.   The processor readable medium of claim 18, further containing processor  
2   executable instructions for applying the at least one local oscillator signal to convert the  
RF signal down to an in-phase baseband signal and a quadrature baseband signal.

22.   The processor readable medium of claim 18, further containing processor  
2   executable instructions for generating a quadrature representation of at least one of the  
first and second signals.

23.   A wireless communication device comprising:  
2       a downconverter configured to  
          receive a first signal having a first frequency and a second signal having a  
4       second frequency, the first and second frequencies different from a frequency of an RF  
signal,  
6           generate at least one local oscillator signal having a frequency determined  
as a function of the first and second frequencies, and  
8           generate at least one baseband signal as a function of the at least one local  
oscillator signal and the RF signal; and  
10       a modem to demodulate the at least one baseband signal.

24. The wireless communication device of claim 23, wherein the frequency of  
the local oscillator signal is one of a sum and a difference of the first and second  
frequencies.

25. The wireless communication device of claim 23, wherein the  
downconverter is configured to generate an in-phase local oscillator signal and a  
quadrature local oscillator signal.

26. The wireless communication device of claim 23, wherein the  
downconverter is configured to apply the at least one local oscillator signal to convert the  
RF signal down to an in-phase baseband signal and a quadrature baseband signal.

27. The wireless communication device of claim 23, wherein the  
downconverter is configured to generate a quadrature representation of at least one of the  
first and second signals.

28. An apparatus comprising:  
means for receiving a first signal having a first frequency and a second signal  
having a second frequency, the first and second frequencies different from a frequency of  
an RF signal;  
means for generating at least one local oscillator signal having a frequency  
determined as a function of the first and second frequencies; and  
means for generating at least one baseband signal as a function of the at least  
one local oscillator signal and the RF signal.

29. The apparatus of claim 28, wherein the frequency of the local oscillator  
signal is one of a sum and a difference of the first and second frequencies.

30. The apparatus of claim 28, further comprising means for generating an in-  
phase local oscillator signal and a quadrature local oscillator signal.

31. The apparatus of claim 28, further comprising means for applying the at  
2 least one local oscillator signal to convert the RF signal down to an in-phase baseband  
signal and a quadrature baseband signal.

32. The apparatus of claim 28, further comprising means for generating a  
2 quadrature representation of at least one of the first and second signals.

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